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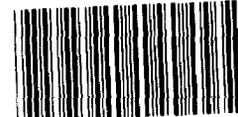
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ENERGY AND MINERALS
DIVISION

B-204613

September 18, 1981

The Honorable John W. Warner
Chairman, Subcommittee on Energy
and Mineral Resources
Committee on Energy
and Natural Resources
United States Senate



116659

Dear Mr. Chairman:

Subject: Anthracite Coal Supply for the 1981-82 Winter
(EMD-81-141)

Your letter of May 13, 1981, (see enc. II) expressed concern about the potential for the anthracite industry to become an effective component in meeting America's energy needs. As agreed with your office, we focused on some of the problems affecting the anthracite industry and consumers in the northeastern States, 1/ State and industry actions since the 1980-81 shortage, and the outlook for the winter of 1981-82. We also obtained information on anthracite exports to foreign countries and the Department of Defense (DOD) facilities in the Federal Republic of Germany, Federal research and development efforts to use anthracite in industrial boilers, and the actions the State of Pennsylvania has taken to encourage the use of anthracite in municipal buildings. Enclosure I contains details on the information requested.

Last winter there was an anthracite coal shortage which affected the availability of some sizes of coal. While the shortage impacted all residential consumers, those who burn anthracite for central heat were not as severely affected as those who burn anthracite for supplemental heat. The extent of the shortage, however, cannot be determined because a data collection system was not in place to capture the number of consumers affected and the amount of coal that could have been burned if it had been available. We believe a shortage of anthracite equal to or greater than that which occurred last winter could occur again this winter. Five northeastern States

1/Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

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estimate residential demand will be higher this year, and producers indicated that production will not increase significantly over last year. Like last winter, however, consumers who burn anthracite for central heat are expected to have the coal they need but consumers who use supplemental heating devices may not be able to get as much coal as they want. Although this will result in an economic cost to supplemental users, it should not pose a threat to their health and safety assuming they will be able to rely on their central heating systems.

We believe there is little that can be done now to avert a shortage this winter. It does not appear that this year's production will be adequate to meet the demand of the supplemental residential anthracite user. Significantly increasing production by opening new mines could take up to one year to obtain permits, authorizations, etc. In order to minimize the possibility that similar shortages do not recur, the problems of identifying an elusive demand and stimulating production of the larger sizes of coal used in residential supplemental heating must be solved. The extent of the problem in the supplemental heating market has not adequately been assessed. The States need to coordinate their efforts and develop a soundly based approach to identify the demand for anthracite-burning supplemental heating devices and their annual coal requirements. The States cannot act alone in developing this approach; they need the assistance of coal dealers, stove manufacturers, and stove sellers as well as consumers.

In addition, there is a need to stimulate production. Producers have long-term contracts for smaller sizes of coal with utilities, industries, and foreign countries. This provides them with an assured demand on which they can plan production. Because producers do not have contracts for the larger sizes of coal used in domestic residential supplemental heating devices, they lack an assured demand on a continuing basis. Consequently, they are reluctant to take the investment risks to produce more anthracite of the larger sizes.

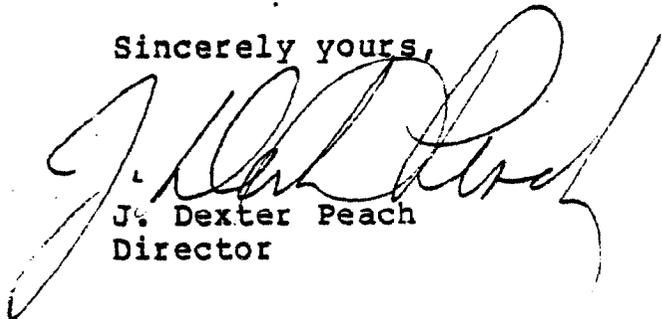
One option to help avert a shortage would be for State and local governments to stockpile supplies of larger sizes of anthracite. This would give the producers their assured demand and could stimulate production. However, the costs of stockpiling must be traded off against the cost which taxpayers in general would have to bear to provide a price advantage to users of supplemental heating devices. States or any other entities could, of course, pass the incremental costs of stockpiling directly and fully through to consumers. The effect of that passthrough, however, might be to reduce or eliminate the price advantage of anthracite for supplemental heat and, in the long term, reduce demand.

Increasing demand for the smaller sizes of coal would increase production and the availability of larger sizes of coal used in residential supplemental heating. According to a Department of Energy official, demand for the smaller sizes of anthracite has increased at a slower rate than the demand for larger sizes of anthracite. Because 4 tons of the smaller sizes are produced for each ton of some of the larger sizes, demand for the smaller sizes must increase four times as much to meet increased demand for the larger sizes. Increasing demand requires long lead times and initiatives to encourage and make possible greater use of anthracite by utilities, industries, and foreign countries. Since sales to industry, utilities, and other countries usually involve long-term contracts, anthracite producers would have the assurance on which to plan future production.

In order to obtain a broad cross section of views concerning anthracite coal supplies and problems in meeting demand, we met with officials from the Department of Energy (DOE); Defense Fuel Supply Center (DFSC); the States of Pennsylvania, New York, Vermont, and Massachusetts; four anthracite producers which mine 100,000 tons of coal or more a year and one which produced less than 25,000 tons; two coal dealers in Massachusetts and three in New York; a coal distributor who sells to 130 dealers in the New England area, and four consumers who burn anthracite for supplemental heat. We also reviewed studies, testimony, DFSC's contracts for 1980, and DOE documents pertaining to (1) anthracite production, (2) shipments to the northeastern States, and (3) exports. Because of time constraints, we did not verify the information provided. Also, because data was not available, we could not assess the degree of impact of the shortage on consumers.

In order to meet the reporting requirements of this request, we did not obtain official comments from the agencies contacted. As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of its issuance. At that time we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,



J. Dexter Peach
Director

Enclosures - 2

ANTHRACITE COAL SUPPLY FOR THE1981-82 WINTERBACKGROUND

Most of the U.S. reserves of anthracite coal (hard coal) are located in northeastern Pennsylvania, in the counties of Lackawanna, Luzerne, Carbon, Columbia, Northumberland, Dauphin, Schuylkill, and Lebanon. Although other States including Virginia, Arkansas, Massachusetts, Connecticut, and Rhode Island have anthracite deposits, the reserves in Pennsylvania are by far the largest in the United States and have the greatest potential for further development. Pennsylvania's reserves have been estimated at 7.4 billion tons.

Although large reserves of anthracite exist, its use peaked in 1917 when production reached more than 100 million tons. After 1917 the use of anthracite declined mainly because it was displaced by other lower cost fuels and production reached a low of 4.8 million tons in 1979. In 1980, anthracite production reached slightly more than 6 million tons or about 1 percent of all coal mined in the United States. Of this, producers exported about 2 million tons to foreign countries and for the Department of Defense facilities in the Federal Republic of Germany and 4 million tons were sold domestically. Domestic consumption of anthracite in 1980 was broken down as follows: residential and commercial heating used 1.5 million tons, electric utilities used 1.3 million tons, and industry used 1.2 million tons. As of December 1980 producers had about 400,000 tons of anthracite in inventory.

Anthracite is difficult to mine. Because of the geology of the anthracite coal seams, the coal is broken in the ground. After the coal is mined, it is cleaned and sized at a preparation plant. There are many more smaller pieces of anthracite extracted than larger pieces. According to testimony before the Senate Subcommittee on Energy and Mineral Resources on March 24, 1981, concerning the supply of anthracite used for home heating, 5 tons of anthracite must be mined to obtain 1 ton of the chestnut and stove size coal. As shown in table 1, different sizes of anthracite have various uses.

Table 1Anthracite Coal Sizes and Uses

<u>Size</u>	<u>Inches</u> <u>(note a)</u>	<u>Principal uses</u> <u>(note b)</u>
<u>Larger:</u>		
Egg	Over 2-7/16	Foundries
Stove	1-5/8 to 2-7/16	Residential
Chestnut	13/16 to 1-5/8	Residential
Pea	9/16 to 13/16	Residential and industrial
<u>Smaller:</u>		
Buckwheat No. 1	5/16 to 9/16	Residential and industrial
Buckwheat No. 2 (rice)	3/16 to 5/16	Residential, industrial, and commercial
Buckwheat No. 3 (barley)	3/32 to 3/16	Residential, industrial, and commercial
Buckwheat No. 4	3/64 to 3/32	Residential, industrial, and commercial
Buckwheat No. 5	Less than 3/64	Utilities and industrial

a/"Coal Data: A Reference," (July 1980, DOE/EIA-0064/80).

b/Pennsylvania Department of Commerce.

For residential heating purposes, anthracite coal can be used in automated stokers as the central heating system or in fireplace inserts and stoves to supplement oil, gas, and electric heating systems. The size of coal used for domestic central and supplemental heating systems differ. Central heating systems use small sizes of coal such as buckwheat, rice, and barley. Supplemental heating uses the larger sizes of coal such as pea, chestnut, and stove.

Last winter there was an anthracite coal shortage which affected the availability of the larger sizes of coal more than

the smaller sizes. While the shortage impacted all residential consumers, those who burn anthracite as central heat were not as severely affected as those who burn anthracite for supplemental heat. According to State officials, the consumers using anthracite for central heat were able to get coal because they use the more abundant smaller sizes and producers guaranteed that these consumers received coal on a priority basis. Of the three sizes of anthracite used in supplemental heating devices, consumers reported they could not purchase adequate supplies of chestnut and stove. The extent of the shortage cannot be determined, however, because a data collection system was not in place to capture the source and effects of this shortage. Consequently, no comprehensive record exists regarding the number of consumers affected and the amount of coal that could have been burned if it had been available.

ANTHRACITE SHORTAGE IN 1980-81
AND PROSPECTS FOR 1981-82

The use of anthracite burning supplemental heating devices has increased as home heating costs have risen. How much consumers use these supplemental devices can fluctuate considerably depending on the price of other primary fuels (oil, gas, or electricity) and the weather. The northeastern States experienced unseasonably cold weather during the winter of 1980-81, and the costs of other fuels were higher than for anthracite. Data prepared in March 1981 by the Massachusetts energy office showed that residential consumers paid an average of \$4.92 per million Btu's for anthracite, \$8.29 per million Btu's for heating oil, and \$29 per million Btu's for electricity. To reduce their fuel bills, many consumers would have used their supplemental heating devices but could not purchase the anthracite they wanted.

Producers could not satisfy last winter's demand. The producers' response was tempered or constrained by several factors (1) it is very difficult to mine and prepare coal during periods of sub-freezing temperatures; (2) it can take up to 1 year to obtain permits, authorizations, etc., to expand production; and (3) producers do not believe it is in their commercial interest to meet this demand surge by investing in greater production without assured buyers for the coal. Producers stated that they have increased production at various times throughout the past 20 years, only to find that the demand did not continue. Further, producers do not want to increase production for 1 ton of the chestnut and stove sizes until they can be assured of a market for the 4 tons of small coal remaining.

Producers gear their production to the smaller sizes because they have greater assurance of long-term demand at predictable levels. Producers have both domestic and foreign long-term contracts for these sizes of coal. However, domestic demand for the larger sizes is tied largely to residential use for supplemental heating where long-term contracts do not exist.

To preclude a similar shortage this winter, the State energy offices, between January 1981 and July 1981, projected anthracite requirements for the northeastern States and presented these estimates to producers in July. They indicated demand will be higher this winter than last winter. Massachusetts indicated that it will need between 60,000 tons and 70,000 tons, New York estimated it would need a total of 285,000 tons, and Pennsylvania indicated residential consumption would increase between 37,000 tons and 60,000 tons over last year. In addition, during hearings held on March 24, 1981, before the Senate Subcommittee on Energy and Mineral Resources, New Hampshire officials testified that the State's anthracite consumption could triple, and Connecticut testified its needs may double. However, the States have not consolidated their estimates of demand; and DOE has not prepared any estimates of anthracite consumption by residential users.

Producers indicated that total production will not increase significantly over last year. Producers expect that overall production may increase by only 10 percent this year. According to DOE data, as of August 29, 1981, anthracite production was about 4.9 percent higher than for the same period in 1980. If demand increases as the States project and production increases are not adequate to meet this demand, a shortage equal to or greater than last year will occur this winter. As was the case last year, the effects of a shortage will be felt essentially by users of supplemental heating devices. Although this will result in an economic cost to such users, it should not pose a threat to their health and safety assuming they will be able to rely on their central heating systems.

Relationship of exports to domestic markets

A large amount of anthracite is exported to foreign countries and DOD's facilities in the Federal Republic of Germany. Exports provide anthracite producers an assured demand on which they can plan production. Between 1977 and 1980 total exports of anthracite coal more than doubled. Anthracite producers export coal to Canada, Mexico, South America, Europe, Asia, Africa, Australia, and DOD facilities in the Federal Republic of Germany. Table 2 shows the increase in anthracite exports between 1977 and 1980:

Table 2U. S. Anthracite Exports 1977 to 1980

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
	- - - - - (short tons) - - - - -			
Exports to foreign countries	624,908	866,279	1,232,706	1,794,971
Purchases by the U.S. Department of Defense	<u>298,000</u>	<u>275,000</u>	<u>365,000</u>	<u>340,000</u>
Total	<u>922,908</u>	<u>1,141,279</u>	<u>1,597,706</u>	<u>2,134,971</u>

Source: U.S. Department of Energy, Fossil Energy, March 22, 1981, based on data provided by the Energy Information Administration.

Although detailed size data for all anthracite exported abroad is not available, using the above DOE data and an April 1981 draft DOE report on anthracite exports, we estimated that in 1980, at least a third of the anthracite exported to foreign countries (excluding residue material) was of the smaller sizes used for industrial and manufacturing purposes and about 842,000 tons were the sizes which were also used by the residential supplemental heating market in the United States.

Of the 842,000 tons, about 292,000 tons were exported to DOD's facilities in the Federal Republic of Germany. These 292,000 tons were the larger sizes which were in short supply in the northeastern States last winter. The balance of DOD's purchases or about 48,000 tons was pea coal which was not in short supply. About 550,000 tons of the 842,000 tons were exported to France, the Netherlands, and Belgium/Luxemburg as shown on table 3. We contacted DOE to determine the specific sizes of coal exported to these countries. DOE could not delineate the 550,000 tons by specific size, but officials explained that it is the larger sizes used by these countries for residential heating. The purchases by France, the Netherlands, and Belgium/Luxembourg of anthracite have increased substantially since 1977.

Table 3Exports of Larger Size Anthracite 1977 to 1980

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
	- - - - - (short tons) - - - - -			
France	20,125	42,016	161,661	266,240
Netherlands	-	21,061	82,293	126,830
Belgium/Luxembourg	-	-	29,896	156,565
Total	<u>20,125</u>	<u>63,077</u>	<u>273,850</u>	<u>549,635</u>

Source: U.S. Department of Energy, Fossil Energy, March 22, 1981, based on data provided by the Energy Information Administration.

One suggestion to alleviate the anthracite shortage in the northeastern States was curtailing DOD exports during the winter months. A DOD official testified on March 24, 1981, at hearings before the Senate Subcommittee on Energy and Mineral Resources that, rather than curtailing exports, DOD would revise its receiving schedule for anthracite shipments to the Federal Republic of Germany so that deliveries would not be made during January, February, and March if there were a similar shortage during the winter of 1981-82. Although DOD was willing to revise its receiving schedule, this no longer seems plausible. Officials from the Defense Fuel Supply Center, DOD's coal purchasing agent, explained that anthracite producers are about 150,000 tons behind in their deliveries under DOD contracts, and deliveries will have to be made during the upcoming winter months so that overseas facilities have adequate coal to meet their heating needs.

ACTIONS TAKEN BY STATES AND
PRODUCERS SINCE THE SHORTAGE

Toward the end of November 1980, Pennsylvania officials began receiving telephone complaints concerning shortages of anthracite. The Lieutenant Governor of Pennsylvania, who serves as Chairman of the Governor's Energy Council, hosted a meeting between eight coal producers and energy representatives of all the northeastern States. During this meeting on January 27, 1981, the State energy officials and producers discussed the immediate problems faced by consumers and the long-term prospects of demand in the residential market. The participants agreed to take certain actions. Specifically:

- The producers guaranteed that consumers who used anthracite coal as their central or sole source of residential heating

would receive adequate coal supplies to take them through the winter heating season.

- The States agreed to initiate education programs emphasizing the need for coal consumers and retailers to stockpile coal during the summer. In addition, the States agreed to survey coal distributors and retailers, estimate demand levels for the coming winter heating season, and provide this information to the anthracite producers at a follow-up meeting.

A follow-up meeting was held on July 22, 1981, between the anthracite producers and the northeastern States energy officials. The topics discussed were the prospects and remedies for a coal shortage during the 1981-82 heating season with particular emphasis on demand for anthracite coal in the supplemental heating market and supply availability. The northeastern State energy officials indicated that their efforts to encourage stockpiling of coal have not been effective. While some consumers have stockpiled coal, others have not. Dealers generally have not been buying coal during the summer because of the high interest rates they would incur to carry a stockpile. The State energy officials went on to point out that based on their surveys the demand for all types of anthracite coal during this coming heating season will be higher than last year.

We found that the methodologies used in conducting the surveys varied and the estimates are incomplete and unverified. For example:

- The Massachusetts energy office demand study was based on responses from 57 coal dealers identified by scanning various Massachusetts phone directories. A Massachusetts energy official stated that the coal dealer responses were not verified, and he believes some dealers overstated their needs to assure that they will obtain coal supplies. This survey projected that Massachusetts will need 60,000 tons to 70,000 tons of all sizes of anthracite for the 1981-82 heating season.
- The New York State energy office's study was also based on a survey of coal dealers. The study, conducted by county energy representatives, estimated that New York's anthracite requirements for 1981-82 would be 285,000 tons, an increase of 65 percent over last year. A New York State energy office official stated that this survey is not all-inclusive because 4 of the 52 counties and some coal dealers did not respond. The energy official also told us that more realistic demand data is not available. In one New York county, which experienced the greatest problem last year, a county official stated that the county does not have reliable demand estimates for either central or supplemental users. The reason cited was that demand information based on dealer responses could include double counting of the

same consumer. For example, a consumer could have contacted more than one dealer to obtain coal and each dealer could have included this consumer's needs in responding to the survey.

- The Pennsylvania energy office estimated the number of coal-fired space heating units sold in the State. This was based on a New Hampshire stove magazine survey as well as the States' own survey of stove dealers. While the study noted that the estimate of stove sales in Pennsylvania is imprecise, it concluded that Pennsylvania's residential consumption might increase between 37,000 tons and 69,000 tons for this heating season. Pennsylvania did not survey coal dealers.

During the meeting the producers expressed confidence that all users of coal for central residential heat will be able to obtain coal supplies to last them through this winter as was done last winter. The producers had this confidence because three of four major producers are either increasing or plan to increase production. These producers, however, did not specify how much they would increase production. One stated he would redistribute supplies from other consumers.

OTHER INFORMATION REQUESTED

Your office also requested information concerning Federal research and development efforts to increase the use of anthracite in industrial boilers and the actions the State of Pennsylvania has taken to encourage the use of anthracite in municipal buildings. The following sections provide a discussion of these topics.

DOE's research and development

DOE's current coal conversion research and development in fluidized-bed combustion and coal mixture combustion will not increase the demand for the smaller sizes of coal which account for 80 percent of the anthracite mined. According to a DOE official, these industrial boiler technologies would use anthracite residue material (culm) rather than freshly mined anthracite which can be sold for residential heating.

In a fluidized-bed system, sized and crushed coal and limestone (or dolomite) are mixed in a heated chamber. Air is blown into the chamber to mix the coal and limestone in such a manner that the limestone absorbs the sulfur dioxide that is released from the coal. Hot water or steam is produced and may be used to heat buildings, generate process steam for industrial purposes, or generate electricity. Two types of fluidized-bed boilers are being developed (1) atmospheric boilers and (2) pressurized boilers.

The atmospheric fluidized-bed boiler, which is more advanced, operates at normal pressure to produce steam. This technology has both utility and industrial applications. The pressurized fluidized-bed boiler operates at 7 to 16 times normal pressure to produce hot pressurized combustion gases necessary for gas turbines. This technology is currently being developed solely for utility applications. DOE had planned three cost-sharing projects to demonstrate atmospheric fluidized-bed combustion systems using anthracite culm as the primary fuel at three Pennsylvania locations--Shamokin, Wilkes Barre, and East Stroudsburg. According to a DOE official, the Shamokin project is about 98 percent complete, and DOE expects the unit will begin operating during the 1981-82 winter season. The East Stroudsburg project is in the design phase, and the Wilkes Barre project was eliminated from the 1982 budget. DOE has not funded any research to use anthracite in a pressurized fluidized-bed combustion system.

According to a DOE official, conventional atmospheric fluidized-bed boilers are being offered commercially now using bituminous coal and commercial offerings for anthracite culm-fired boilers could occur within a year depending on the success of the Shamokin facility. Pressurized fluidized-bed boilers probably will not be offered for commercial sale until the 1990s. The official stated that while anthracite culm could be burned in pressurized fluidized-bed boilers, it is more likely these boilers would be fueled with bituminous coal because bituminous coal is currently less expensive.

The other research and development effort--coal mixture combustion--is an effort to identify ways of mixing 70 percent coal with either water, methanol, ethanol, or biomass to retrofit oil burning boilers to use the resulting fuel mixture. DOE plans to consider the use of anthracite in these mixtures sometime during fiscal year 1982 or fiscal year 1983. A DOE official pointed out, however, that there are problems associated with using anthracite in these mixtures, and it does not appear that anthracite has as much promise as bituminous coal.

State of Pennsylvania actions to encourage conversion to anthracite

The State of Pennsylvania is committed to using coal in State-owned facilities. In 1979 the State initiated actions to increase the use of coal in State-owned buildings. The Governor directed the Department of General Services to study the feasibility of converting 28 State-owned boiler plants which now use natural gas or oil to coal. In early 1980, the Department completed its study, submitted a capital request to support seven coal conversion projects, and received approval from the State legislature.

Of the seven approved conversion projects, three are designed to use anthracite coal. The first conversion should be completed

by December 1982. When complete, the three anthracite conversion projects will use about 60,000 tons of anthracite. One boiler will use culm, another will use buckwheat, and one will use pea coal. According to a Department of General Services official, these current conversion projects are the first phase in the State's commitment to greater use of coal. After the seven projects are completed, the State plans to convert other boilers. At the time of our review, it was not known how many additional conversions the State would make.

In addition, all new State construction must consider using coal for central heating purposes. Currently, the State has two construction projects underway which will utilize smaller sizes of anthracite coal.

JAMES A. MC CLURE, IDAHO, CHAIRMAN

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United States Senate

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, D.C. 20510

May 13, 1981

Milton J. Socolar
Acting Comptroller General
441 G Street, N.W.
Washington, D. C. 20548

Dear Acting Comptroller General:

America, faced with ever increasing petroleum prices dictated by the OPEC Cartel, has embarked on a policy of maximizing its own energy resources so that it can ultimately control its own destiny in the energy arena.

The current Administration, in implementing this policy, has called for the federal government to deregulate the energy industry whenever and wherever possible. The federal government's role, under this approach, is to lend encouragement and assistance to the energy industries rather than adopt an obstructionist posture in the development of our energy resources. The government's role has included being a clearinghouse for information, responding and adopting policies designed to stimulate and encourage development of our domestic energy resources.

Recently it has come to my attention that America's drive towards its goal of energy independence may be lagging in one resource area, and that governmental policy might play a part in remedying that situation.

In response to my request, the Congressional Research Service of the Library of Congress prepared a report for the Senate Energy and Natural Resources Committee, raising significant policy questions about the role of government in relation to the anthracite coal industry.

In an effort to examine the issues raised by the Congressional Research Service in greater detail, I am submitting to you a copy of its March 20, 1981 report entitled "An Overview of the Anthracite Industry".

It is America's goal to maximize its energy resources and provide an energy supply for the American public that is reliable and obtainable.

In CRS's report under the topic entitled "Potential Legislative Considerations" the Service raises six questions which cast doubt on whether America's anthracite industry can reach its maximum potential and become an effective component of America's energy

quotient.

Using the CRS study as a starting point, I would appreciate GAO's further review and assessment of the problems and issues concerning the anthracite industry that most need legislative and administrative attention. Outside of the questions raised by the Service's study, I am particularly interested in present and planned federal, state, and private involvement in gathering information about the industry; in sponsoring research and development to improve the industry's production capability; and in formulating and enforcing clean air standards which may affect use of anthracite.

I would hope that a report on such matters would be forthcoming in the near future. Please work with Roger Sindelar, Counsel to the Subcommittee on Energy and Mineral Resources of the Energy and Natural Resources Committee (224-0613) on this issue.

Sincerely,



John W. Warner

Chairman

Subcommittee on Energy and
Mineral Resources

RS:skw